

# State of Wyoming Retirement System

Actuarial Valuation Report  
for the Year Beginning January 1, 2018



April 6, 2018

Board of Trustees  
**State of Wyoming Retirement System**  
6101 Yellowstone Road  
Suite 500  
Cheyenne, WY 82002

Dear Board of Trustees:

**Subject: Actuarial Valuation as of January 1, 2018**

We are pleased to present the report of the actuarial valuation of the State of Wyoming Retirement System ("the Fund") for the plan year commencing January 1, 2018. This report describes the current actuarial condition of the Fund, determines the calculated employer contribution rate (the actuarially determined contribution rate), and analyzes changes in this contribution rate from the prior year. Valuations are prepared annually, as of January 1, the first day of the Fund's plan year.

**Financing objectives and funding policy**

The employer and employee contribution rates are specified in the statute. The purpose of this actuarial valuation is to determine whether or not this statutory contribution is sufficient to meet the obligations of the Fund.

**Progress toward realization of financing objectives**

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of a plan's funded status. The funded ratio, based upon the assumption of no further cost-of-living adjustment increases as of January 1, 2018 is 76.28%. In the January 1, 2017 valuation, this funded ratio was 78.14%. On a market value of assets basis, the funded ratio increased from 73.88% as of January 1, 2017 to 76.74% as of January 1, 2018. The funded status alone is not appropriate for assessing the need for future contributions. The funded status is also not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

**Benefit provisions**

The benefit provisions reflected in this valuation are those, which were in effect on January 1, 2018, including recent legislation that affects benefits for members who join the State of Wyoming Retirement System later than August 31, 2012. W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change. Therefore, this valuation does not include any liability for future cost-of-living increases.

The benefit provisions are summarized in Appendix B of the report.

### Assumptions and methods

Actuarial assumptions and methods are set by the Board, based upon recommendations made by the plan's actuary. The current assumptions used in the actuarial valuation were adopted by the Board effective August 23, 2017 and were first utilized with the January 1, 2018 valuation report. For a detailed description of the experience related to these assumptions, as well as the rationale for any changes, please see our latest Wyoming Retirement System Actuarial Experience Study Report. Our experience study report was dated January 10, 2018 and it covered the five-year investigation period ending December 31, 2016.

Below is a summary of the changes in assumptions:

1. **Inflation:** reduce the current assumption of 3.25% to 2.25%.
2. **Real rate of return:** increase the current assumption from 4.50% to 4.75%.
3. **Nominal rate of return:** decrease the nominal investment return assumption (the sum of inflation and the real rate of return) from 7.75% to 7.00%.
4. **Wage inflation:** reduce the wage inflation assumption from 4.25% to 2.50%.
5. **Payroll growth:** reduce the assumed growth in total payroll from 4.25% to 2.50%.
6. **Administrative expenses:** recommend reducing the assumed annual increase in expenses from 6.50% per year to 2.50%.
7. **Post-retirement mortality, disabled lives mortality, active life mortality:** update to the RP2014 table, projected generationally using MP 2017.
8. **Salary increase:** decrease the assumed salary increases and to move from age-based merit and promotion increases to service-based merit and promotion increases.
9. **Retirement (unreduced retirement):** modify the retirement rates to reflect actual experience.
10. **Early (reduced) retirement:** modify the retirement rates to reflect actual experience.
11. **Termination (withdrawal):** adjust rates to reflect observed experience.
12. **Disability:** reduce rates to reflect observed experience.

The assumption changes increased the accrued liability by \$278 million (a 3% increase).

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. The actuarial calculations presented in the report are intended to provide information for rational decision making.

The 8.37% employer contribution and the 8.25% employee contribution are the rates that comply with State law. Due to the many factors affecting a retirement system, users of this report should be aware that contributions made at that rate do not necessarily guarantee long-term benefit security.

The employer contribution requirement in Table 1 of this report is determined using the actuarial assumptions and methods disclosed in Appendix A of this report. This report does not include a detailed assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

All assumptions and methods are described in Appendix A of our report.

#### **Data**

Member data for retired, active and inactive members was supplied as of January 1, 2018 by the Fund's staff. We did not audit this data, but we did apply a number of tests to the data, and we concluded that it was reasonable and consistent with the prior year's data.

Asset and financial information as of January 1, 2018 was prepared by Wyoming Retirement System and is the responsibility of management. Eide Bailly, LLP provided us the asset and financial information and will opine on Wyoming Retirement System's statements.

#### **Plan experience**

As part of each valuation, we examine the Fund's experience relative to the assumptions. As experience in a given year deviates from the assumptions, a gain occurs if the liabilities grow slower than the assumption set anticipates and a loss occurs if the liabilities grow faster. This past fiscal year, the Fund had a total experience loss of approximately \$24 million, composed of a \$37 million investment loss, a \$34 million contribution loss, and a \$95 million liability gain. The gain in liability was primarily due to salary increases being less than expected. The aggregate results of these analyses are disclosed in Tables 4 and 5 under Section III of the report.

**Actuarial certification`**

All of the tables contained in this actuarial valuation report were prepared by Gabriel, Roeder, Smith & Company. Historical information for years prior to 2010 was prepared by the prior actuarial firm and was not subjected to our actuarial review.

We certify that the information presented herein is accurate and fairly portrays the actuarial position of the Fund as of January 1, 2018.

All of our work conforms with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of state law and, where applicable, the Internal Revenue Code and ERISA. The undersigned are independent actuaries and consultants. Mark Randall and Leslie Thompson are Enrolled Actuaries and Mark Randall, Leslie Thompson, and Paul Wood are Members of the American Academy of Actuaries, and all three meet all the Qualification Standards of the American Academy of Actuaries.

Finally, all of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,  
**Gabriel, Roeder, Smith & Company**



Mark R. Randall, FCA, EA, MAAA  
Chief Executive Officer



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# SECTION I

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## EXECUTIVE SUMMARY



## Executive Summary

Item	January 1, 2018	January 1, 2017
	No COLA	No COLA
1. Contributions:		
a. Total normal cost	10.96%	11.55%
b. Employee contributions	(8.25%)	(8.25%)
c. Net employer normal cost	2.71%	3.30%
d. Amortization payment	7.65%	5.72%
e. Administrative expenses	0.38%	0.35%
f. Required contribution	10.74%	9.37%
g. Statutory contribution	(8.37%)	(8.37%)
h. Shortfall/(surplus)	2.37%	1.00%
i. Additional rate increase per Enrolled Act No. 65*	(0.25%)	N/A
j. Updated shortfall/(surplus)	2.12%	1.00%
2. Funding Elements:		
a. Market value of assets (MVA)	\$7,358,526,012	\$6,678,504,705
b. Actuarial value of assets (AVA)	\$7,314,683,343	\$7,063,051,856
c. Actuarial accrued liability (AAL)	\$9,588,652,976	\$9,039,303,831
d. Unfunded/(overfunded) actuarial accrued liability	\$2,273,969,633	\$1,976,251,975
3. Contributions and Ratios:		
a. Annual required contribution	\$191,677,662	\$173,551,431
b. Actual contributions	N/A	148,746,669
i. Employer	N/A	147,037,307
ii. Other	N/A	1,709,362
c. Percentage contributed	N/A	85.71%
d. Funded ratio on an actuarial basis (AVA/AAL)	76.28%	78.14%
e. Funded ratio on a market basis (MVA/AAL)	76.74%	73.88%
f. Projected payroll	\$1,784,888,475	\$1,851,873,634

\*Per Enrolled Act No. 65, both employee and employer contribution rates will increase 0.25% per year for the next four years starting in September 1, 2018.

# SECTION II

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## DISCUSSION

## Contribution Requirements

- Exhibits throughout this report are based primarily, unless stated otherwise, on the assumption of no future cost-of-living adjustments (COLAs).
- W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change. The actuarial value funded ratio is 76.28% and the market value funded ratio is 76.74%.
- The actuarial assumptions have been updated since the prior valuation. For a detailed description of the experience related to these assumptions, as well as the rationale for any changes, please see our latest Wyoming Retirement System Actuarial Experience Study Report.
- The amortization payment is based upon the following assumptions:
  - 30-year closed-layered funding period
  - Amortization payment amounts are calculated in such a way that they will increase as a level percentage of payroll
  - Total payroll increases are assumed at 2.50% per year, and
  - Future growth in the number of active members is not reflected in the annual valuation
- The analysis of the changes in the contribution rates is shown in Table 5 under Section III of the report
- Pursuant to recently passed legislation, the contributions will increase for the both the employee and employer 0.25% per year for the next four years starting in September 2018.
- The calculated funding period assuming the new contribution rates is 27 years. In the January 1, 2017 valuation, the funding period was 40 years. Projection results were produced under a separate cover.

## Calculation of Contribution Rates

The funds available to pay benefits come from two sources, contributions and investment income on those contributions (the majority of the funds available to pay benefits typically come from investment income). The Fund receives contributions from two sources, employer contributions and member contributions, both of which are determined as a percentage of pay. As shown in Table 1 under Section III of the report, the employer contribution rate has three components:

- The normal cost percentage (NC%)
- The amortization percentage (UAAL%)
- The administrative expenses

The NC% is the theoretical amount which would be required to pay the members' benefits if this amount had been contributed from each member's entry date and if the fund's experience exactly followed the actuarial assumptions. The NC% is shown in Table 3 under Section III of the report.

Members are required to make employee contributions and only the excess of the NC% over the member contribution rate is included in the employer contribution rate.

The actuarial accrued liability (AAL) is the difference between (i) the actuarial present value of all future benefits for all current participants of the fund, including active, inactive and retired members, and (ii) the actuarial present value of future normal costs. Thus, the AAL represents the liability associated with past years. The unfunded actuarial accrued liability (UAAL) is the difference between the AAL and the actuarial value of assets (AVA). It is the shortfall/excess between the liability associated with prior years (the AAL) and the assets actually accumulated (the AVA). This shortfall/excess can arise from several sources, including actuarial gains and losses which are caused by differences between actual experience and the plan's assumptions, changes to the plan's actuarial assumptions, and amendments to the benefit provisions.

The UAAL% is the amount required to fund this difference. It is the amount, expressed as a level percentage of payroll, necessary to amortize the UAAL. This amortization is over a closed period of 30 years beginning January 1, 2018 and will be paid off over 30 years. Future valuations will include additional amortization layers as a new base is established each year to amortize whatever new unfunded liability or surplus that may develop each year. The Executive Summary shows the UAAL%, called Amortization Payment, compared to that of last year.

Assumed administrative expenses are the average of the prior two years, with each year projected at 2.5% to the valuation date.

The calculated rate is used in determining the contributions necessary to meet the Actuarially Determined Contribution for the twelve-month period beginning January 1, 2018. As of January 1, 2018, the employer contribution is within 2.36% of meeting the Actuarially Determined Contribution. The current shortfall in contribution is expected to persist for at least the next five years.

## Financial Data and Experience

As of January 1, 2018, the Fund has a total market value of \$7,359 million. Financial information was received from Eide Bailly, LLP.

Table 7 under Section III of the report shows a reconciliation of the market values between the beginning and end of 2017.

During 2017, the total investment return on the market value of assets (MVA), as reported by Meketa Investment Group, Inc., was 14.20%, as shown in Table 10 under Section III of the report.

In determining the contribution rates and funded status of the Fund, an actuarial value of assets (AVA) is used rather than the market value of assets. The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (or less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of investment expenses. An adjustment is made if the actuarial value is not within 20% of the Market Value. For any year following a year in which the 20% of market value adjustment was applied, the actuarial value is determined as if the adjustment was not applied in the previous year.

The development of the AVA is shown in Table 9 under Section III of the report. The AVA is \$7.3 billion. The AVA is 99.40% of the MVA as of December 31, 2017, compared to 105.76% last year. The difference between the AVA and the MVA is the deferred gains and losses. As of January 1, 2017, the total deferred loss was \$385 million. As of January 1, 2018, the total deferred gain was \$44 million. Having a deferred gain in the AVA is an indicator that the funded ratio will have an upward “tilt” in the near term, and contribution requirements will likewise have downward pressure.

In addition to the market return, Table 10 also shows the return on the actuarial value of assets for the Fund. For 2017, this return was 7.14%. Since this return is less than the assumed 7.75% investment return for the prior year, an actuarial loss occurred increasing the unfunded actuarial accrued liabilities of the Fund by \$37.5 million.

## Member Data

Member data as of January 1, 2018 was supplied electronically by the Fund's staff. While we did not audit this data, we did perform various tests to ensure that it was internally consistent, consistent with the prior year's data, and was reasonable overall.

Table 15 under Section III of the report shows the number of members by category (active, inactive, retired, etc.) along with member statistics. Tables 16 through 28 show summaries of certain historical data and include membership statistics.

Total active member payroll decreased 3.62% last year, compared to a decrease of 0.37% from the prior year.

The number of active members in Tier 1 decreased, from 23,388 to 21,286. There were 1,227 members who retired out of Tier 1, compared to 1,228 who retired out of Tier 1 last year.

Of the 35,013 active participants, 5,899 are eligible or will become eligible for unreduced retirement and 7,182 are eligible or will become eligible for reduced retirement in 2018.

The average of the final average salaries for participants who retired or became disabled this year is \$52,083.

Changes in payroll are significant because the methodology used in the valuation to amortize the unfunded actuarial accrued liability assumes a growing payroll into the future. If the payroll does not grow at the assumed 2.50% per year average, then the current amortization payments may be understated and the funding position of the Fund will not strengthen as assumed over time. Higher than expected payroll growth, however, has the opposite effect of this and the funded position of the Fund should trend toward 100%. Table 5 under Section III of the report shows, for the past year, payroll for the plan increased less than expected so the effect is an increase in the calculated contribution rate of 0.47% of payroll.

One reason payroll increased less than expected is that the salary, for continuing active participants, increased less than expected. This represented a gain to the Plan, as shown in Table 4 under Section III of the report.

## Benefit Provisions

Appendix B of the report includes a more detailed summary of the benefit provisions for the Fund. A brief summary is as follows:

A new tier of benefits was signed into law on March 23, 2012 and is effective for new members joining the System on or after September 1, 2012.

- *Tier*
  - Members who join the State of Wyoming Retirement System by August 31, 2012 are in Tier 1, while members who join later are in Tier 2
- *Normal Retirement Eligibility*
  - For Tier 1 member - Age 60 with at least four years of service
  - For Tier 2 member - Age 65 with at least four years of service
- *Normal Retirement Benefit*
  - For Tier 1 member - 2.125% of employee's Highest Average Salary for each year of credited service for the first 15 years of service credit plus 2.25% of Highest Average Salary for any years of service credit exceeding 15 years. This amount is reduced by 5.0% per year that the employee is under age 60.
  - For Tier 2 member - 2.00% of employee's Highest Average Salary for each year of credited service. This amount is reduced by 5.0% per year that the employee is under age 65.

However, members retiring with a combined age and service of at least 85 receive an unreduced benefit. Employees hired prior to July 1, 1981 may be entitled to benefits earned under a different formula.
- *Normal Form of Payment*
  - Monthly benefit for life with a lump-sum death benefit equal to the excess (if any) of the employee contributions with interest over the total benefits received.
- *Employee Contributions* are required
  - 8.25% of pay.
- *Post-retirement Cost-of-Living Adjustments (COLAs)*
  - W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change.

Pursuant to Enrolled Act No. 65, the contributions will increase for the both the employee and employer 0.25% per year for the next four years starting in September 2018.

Pursuant to Enrolled Act No. 10, for a non-vested member hired on or after July 1, 2018, the refund of contributions is based solely on contributions paid by a reduction in cash salary of the employee. Any employer pickup contribution is not eligible for a refund.

## Actuarial Methods and Assumptions

Appendix A of the report includes a summary of the actuarial assumptions and methods used in this valuation. A few highlights are listed as follows:

- Costs are determined using the Entry Age Normal actuarial cost method, calculated as a level percentage of payroll.
- The unfunded actuarial accrued liability is amortized over a 30 year closed layered period as a level percent of payroll. This is the first valuation using a closed amortization period. Future valuations will include additional amortization layer bases.
- The assumed annual investment return rate is 7.00%, with assumed inflation of 2.25%.
- Payroll is assumed to increase at 2.50% per year.
- Inactive vested participants are assumed to retire at age 60 (65 for Tier 2) or on the valuation date if older.
- The benefit amount is not available for members entitled to deferred benefits. The benefit amount and present value of benefits expected to be paid to vested inactive non-retired members is approximated using the data provided.

The average future lifetime for current pensioners is 16.2 years.

The actuarial assumptions and methods were reviewed in detail as part of the 2017 Experience Study covering the five year period ending December 31, 2016. Please see Appendix A for a summary of the new assumptions.



## **GASB and Funding Progress**

Governmental Accounting Standards Board Statement Number 67 (GASB 67) contains certain accounting requirements for the Fund. Schedules, notes and required supplementary information are provided under separate cover.

## SECTION III

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### SUPPORTING EXHIBITS

**Table 1**  
**Calculation of Employer Contribution Rate**  
**(Assumes No Future Cost-Of-Living Increases)**

Item	January 1, 2018	January 1, 2017
1. Projected valuation payroll	\$1,784,888,475	\$1,851,873,634
2. Present value of future pay	\$14,382,166,810	\$14,482,995,426
3. Employer normal cost rate	2.71%	3.30%
4. Actuarial accrued liability for active members		
a. Present value of future benefits for active members	\$5,113,244,191	\$5,386,064,760
b. Less: present value of future employer normal costs	(332,644,103)	(407,277,588)
c. Less: present value of future employee contributions*	(1,186,528,760)	(1,194,847,124)
d. Actuarial accrued liability	\$3,594,071,328	\$3,783,940,048
5. Total actuarial accrued liability for:		
a. Retirees and beneficiaries	\$5,522,919,403	\$4,843,818,947
b. Disabled members	38,126,973	32,518,140
c. Inactive members	433,535,272	379,026,696
d. Active members (Item 4d)	3,594,071,328	3,783,940,048
e. Total	\$9,588,652,976	\$9,039,303,831
6. Actuarial value of assets (Table 9)	\$7,314,683,343	\$7,063,051,856
7. Unfunded actuarial accrued liability (UAAL) (Item 5e - Item 6)	\$2,273,969,633	\$1,976,251,975
8. UAAL amortization period	30 years	30 years
9. Assumed payroll growth rate	2.50%	4.25%
10. Employer contribution requirement		
a. UAAL amortization payment as % of pay	7.65%	5.72%
b. Employer normal cost	2.71%	3.30%
c. Administrative expense	0.38%	0.35%
d. Contribution requirement (a + b + c)	10.74%	9.37%

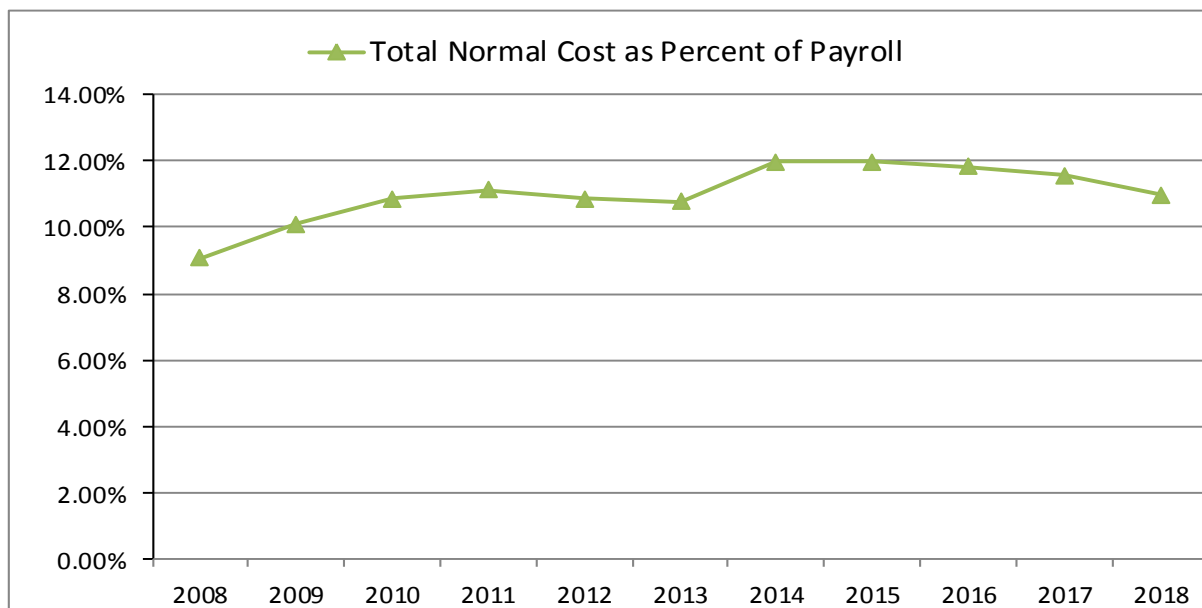
\*Does not include anticipated employee increases under Enrolled Act No. 65.

**Table 2**  
**Cost Breakdown**  
**(Assumes No Future Cost-Of-Living Increases)**

Item	Present Value of Future Normal Costs (1)	Actuarial Accrued Liabilities (2)	Total Present Value of Benefits (3) = (1) + (2)
Age and service allowances based on total service and disability benefits likely to be rendered by present active members	\$1,153,564,137	\$3,564,684,272	\$4,718,248,409
Death-in-service benefits likely to be paid on behalf of present active members (employer financed portion)	33,347,118	86,396,635	119,743,753
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	332,261,608	(57,009,579)	275,252,029
Benefits likely to be paid to vested inactive members	0	373,871,177	373,871,177
Benefits to be paid to members due refunds	0	59,664,095	59,664,095
Benefits to be paid to current retirees, disabled members, beneficiaries, and future beneficiaries of current retirees	0	5,561,046,376	5,561,046,376
Total	\$1,519,172,863	\$9,588,652,976	\$11,107,825,839
Actuarial value of assets	0	7,314,683,343	7,314,683,343
Liabilities to be covered by future contributions	\$1,519,172,863	\$2,273,969,633	\$3,793,142,496

**Table 3**  
**History of Total Normal Cost**  
**(Assumes No Future Cost-Of-Living Increases)**

Fiscal Year Ending December 31 (1)	Total Normal Cost as Percent of Payroll (2)
2008	9.08%
2009	10.10%
2010	10.86%
2011	11.11%
2012	10.86%
2013	10.77%
2014	11.96%
2015	11.96%
2016	11.83%
2017	11.55%
2018	10.96%



**Table 4**  
**Calculation of Total Actuarial Gain/(Loss)**  
**(Assumes No Future Cost-Of-Living Increases)**

Item	January 1, 2018
1. Derivation of Experience Gain/(Loss)	
a. Unfunded actuarial accrued liability (UAAL) - previous valuation	\$1,976,251,975
b. Normal cost (NC) for fiscal year ending December 31, 2017	213,935,463
c. Actual administrative expenses for fiscal year ending December 31, 2017	6,863,445
d. Actuarially determined contribution for fiscal year ending December 31, 2017	326,331,005
e. Interest accrual:	
(i) For whole year on (a)	153,159,528
(ii) For half year on (b) + (c) - (d)	(4,089,369)
(iii) Total interest: (e)(i) + (e)(ii)	149,070,159
f. Change in UAAL due to plan changes	-
g. Change in UAAL due to assumption change	277,789,436
h. Expected UAAL current year: (a) + (b) + (c) - (d) + (e)(iii) + (f) + (g)	2,297,579,473
i. Actual UAAL current year	2,273,969,633
j. Experience gain/(loss): (h) - (i)	23,609,840
k. Experience gain/(loss) as a % of actuarial accrued liability	0.25%
2. Approximate portion of gain/(loss) due to investments (at actuarial value)	(\$37,520,657)
3. Approximate portion of gain/(loss) due to contributions higher or lower than expected	(\$33,838,721)
4. Approximate amount of gain/(loss) due to liabilities: (1)(j) - (2) - (3)	\$94,969,218
a. Age & service retirements	(\$17,497,792)
b. Disability retirements	(361,225)
c. Death-in-service	(929,660)
d. Withdrawal from employment	(6,856,128)
e. Rehires	(806,839)
f. Pay increases	143,461,169
g. Death after retirement	(1,855,204)
h. Other	(20,185,103)
i. Other as a % of actuarial accrued liability	-0.21%

**Table 5****Change in Calculated Contribution Rate Since the Prior Valuation  
(Assumes No Future Cost-Of-Living Increases)**

Item	January 1, 2018
1. Calculated contribution rate as of January 1, 2017	9.37%
2. Change in contribution rate during year	
a. Change in employer normal cost	-0.10%
b. Assumption changes	1.20%
c. Actuarial (gain) loss from investments on actuarial value of assets	0.11%
d. Actuarial (gain) loss from liability sources & administrative expenses	-0.28%
e. Difference between contributions made and required contribution	0.10%
f. Effect of payroll growing (faster)/slower than assumption	0.47%
g. Open amortization period reset to 30 years	-0.13%
h. Other changes	0.00%
i. Total change	1.37%
3. Calculated contribution rate as of January 1, 2018	10.74%

**Table 6**  
**Statement of Plan Net Assets**

<b>Assets at Market Value</b>		
<b>Item</b>	<b>FYE 2017</b>	<b>FYE 2016</b>
1. Cash and Cash Equivalents (Operating Cash)	\$416,656,180	\$669,094,103
2. Receivables		
a. Insurance premium tax	\$0	\$0
b. Buy backs	0	0
c. Employer contributions	7,636,163	10,792,048
d. Employee contributions	7,519,751	10,641,676
e. Securities sold	32,664,265	36,170,940
f. Accrued interest and dividends	10,907,712	11,931,221
g. Currency contract receivable	1,688,898,064	2,428,780,024
h. Other	4,140,794	109,053
i. Rebate and fee income receivable	93,248	0
j. Total receivables	<u>\$1,751,859,997</u>	<u>\$2,498,424,962</u>
3. Investments, at Fair Value	\$7,420,792,878	\$6,320,501,259
4. Liabilities		
a. Benefits and refunds payable	(\$858,584)	(\$791,264)
b. Securities purchased	(43,499,973)	(23,674,013)
c. Administrative and consulting fees payable	(14,884,620)	(6,948,792)
d. Currency contract payable	(1,697,107,759)	(2,405,441,442)
e. Securities lending collateral	(474,432,107)	(372,660,108)
f. Total liabilities	<u>(\$2,230,783,043)</u>	<u>(\$2,809,515,619)</u>
5. Total Market Value of Assets Available for Benefits	\$7,358,526,012	\$6,678,504,705



**Table 7**  
**Reconciliation of Plan Net Assets**

Assets at Market Value		
Item	FYE 2017	FYE 2016
A. Market Value of Assets at Beginning of Year	\$6,678,504,705	\$6,427,796,404
B. Contribution Income:		
1. Contributions		
a. Employee	\$145,007,950	\$147,649,738
b. Employer	147,037,307	149,619,229
c. Other	6,453,663	6,642,286
d. Total	\$298,498,920	\$303,911,253
2. Investment Income		
a. Interest, dividends, and other income	\$129,134,773	\$132,340,455
b. Net appreciation	857,540,444	351,707,235
c. Investment expenses	(64,632,088)	(31,385,672)
d. Net investment income	\$922,043,129	\$452,662,018
3. Securities Lending		
a. Gross income	\$6,234,558	\$2,939,277
b. Deductions	(4,399,598)	(888,302)
c. Net investment income	\$1,834,960	\$2,050,975
4. Benefits and Refunds		
a. Refunds	\$(18,654,997)	\$(18,127,974)
b. Regular monthly benefits	(516,837,260)	(483,482,106)
c. Total	\$(535,492,257)	\$(501,610,080)
5. Administrative and Miscellaneous Expenses	\$(6,863,445)	\$(6,305,865)
C. Market Value of Assets at End of Year	\$7,358,526,012	\$6,678,504,705

**Table 8**  
**Progress of Fund Through December 31, 2017**

Plan Year Ending December 31	Employer Contributions*	Employee Contributions*	Administrative Expenses	Net Investment Income**	Benefit Payments	Transfers	Actuarial Value of Assets
Total	\$ 2,475,786,784	\$ 2,307,073,306	\$ (76,691,479)	\$ 8,615,011,323	\$ (6,656,980,052)	\$ (115,633,895)	
1986	\$ 41,364,465	\$ 36,365,804	\$ (782,000)	\$ 98,998,090	\$ (42,082,765)	\$ -	\$ 900,097,591
1987	39,901,834	36,039,418	(808,023)	91,374,783	(50,604,364)	-	1,016,001,239
1988	38,414,939	33,222,264	(444,343)	103,025,282	(48,627,479)	-	1,141,591,902
1989	36,139,394	36,231,108	(424,136)	128,370,680	(55,459,353)	-	1,286,449,595
1990	38,668,634	38,960,372	(850,148)	114,218,588	(61,154,261)	-	1,416,292,780
1991	38,903,350	39,288,267	(863,301)	148,164,188	(69,348,501)	-	1,572,336,783
1992	42,354,843	42,883,874	(909,653)	175,246,400	(75,211,430)	-	1,756,700,817
1993	41,596,571	42,266,219	(801,026)	189,281,426	(82,480,713)	-	1,946,563,294
1994	42,791,243	43,415,880	(888,518)	136,210,578	(89,707,717)	-	2,078,384,760
1995	43,714,263	44,435,762	(937,480)	230,731,781	(99,689,985)	-	2,296,639,101
1996	43,495,146	44,761,611	(1,028,163)	233,212,720	(108,536,621)	-	2,508,543,794
1997	44,958,544	46,152,691	(1,147,818)	314,340,179	(117,126,096)	-	2,795,721,294
1998	46,183,091	47,366,181	(1,074,562)	436,098,461	(123,858,991)	-	3,200,435,474
1999	48,681,209	50,106,535	(1,182,899)	475,758,627	(132,428,572)	-	3,641,370,374
2000	50,539,675	51,868,059	(1,096,747)	592,379,739	(144,620,949)	-	4,190,440,151
2001	56,517,377	53,792,429	(1,387,930)	439,286,379	(156,189,100)	-	4,582,462,306
2002	57,377,428	58,234,324	(1,281,554)	(66,209,697)	(171,160,286)	(106,978,719)	4,352,423,802
2003	55,363,788	60,848,296	(1,435,922)	376,524,142	(185,826,481)	-	4,657,897,625
2004	60,573,670	61,412,824	(1,644,382)	127,831,761	(201,772,174)	-	4,704,299,324
2005	65,191,670	63,381,309	(1,930,627)	238,882,774	(217,308,520)	(8,655,176)	4,843,861,114
2006	72,664,403	69,020,297	(1,949,051)	409,948,934	(232,944,164)	-	5,160,601,533
2007	83,149,236	78,495,298	(2,005,783)	583,547,681	(249,765,088)	-	5,654,022,877
2008	88,451,655	84,814,014	(2,778,990)	(720,402,274)	(268,232,301)	-	4,835,874,981
2009***	244,063,923	89,298,711	(3,081,105)	868,641,735	(292,256,569)	-	5,742,541,676
2010	104,757,666	99,291,423	(3,600,747)	170,797,772	(314,256,856)	-	5,799,530,934
2011	122,557,906	116,691,540	(5,541,488)	71,962,242	(343,979,208)	-	5,761,221,926
2012	124,648,088	119,052,404	(6,463,506)	126,138,774	(374,629,714)	-	5,749,967,972
2013	128,277,269	122,611,180	(6,513,680)	654,726,838	(404,568,029)	-	6,244,501,550
2014	129,627,747	141,061,289	(5,258,065)	535,776,435	(436,096,614)	-	6,609,612,342
2015	144,622,373	153,529,134	(5,410,522)	382,521,078	(469,954,814)	-	6,814,919,591
2016	151,488,715	152,422,538	(6,305,865)	452,136,957	(501,610,080)	-	7,063,051,856
2017	148,746,669	149,752,251	(6,863,445)	495,488,269	(535,492,257)	-	7,314,683,343

\* Employer contributions include other funding sources and employee contributions may include member redeposits and member service purchase contributions

\*\* Net of investment expenses

\*\*\* December 31, 2009 market values exclude Air Guard Firefighters

**Table 9**  
**Development of Actuarial Value of Assets**

Item	FYE 2017	FYE 2016
1. Actuarial value of assets, beginning of year (without corridor)	\$7,063,051,856	\$6,814,919,591
2. Market value, end of year	\$7,358,526,012	\$6,678,504,705
3. Market value, beginning of year	\$6,678,504,705	\$6,427,796,404
4. Non-investment/administrative net cash flow:		
a. Employee contributions	\$145,007,950	\$147,649,738
b. Employer contributions	147,037,307	149,619,229
c. Other contributions	6,453,663	6,642,286
d. Refund of employee accounts	(18,654,997)	(18,127,974)
e. Retirement benefits	(516,837,260)	(483,482,106)
f. Administrative expenses	(6,863,445)	(6,305,865)
g. Total net cash flow: [sum of (4a) through (4f)]	(\$243,856,782)	(\$204,004,692)
5. Investments and securities lending:		
a. Interest and dividends on investments	\$129,134,773	\$132,340,455
b. Gross income from securities lending	6,234,558	2,939,277
c. Fees and expenses	(69,031,686)	(32,273,974)
d. Total net income: [sum of (5a) through (5c)]	\$66,337,645	\$103,005,758
6. Investment income:		
a. Actual market return: (2) - (3) - (4g) - (5d)	\$857,540,444	\$351,707,235
b. Assumed rate of return	7.75%	7.75%
c. Assumed amount of return	441,973,334	387,390,782
d. Amount subject to phase-in: (6a) - (6c)	\$415,567,110	(\$35,683,547)
7. Phase-in recognition of investment income:		
a. Current year: 0.20 * (6d)	\$83,113,422	(\$7,136,709)
b. First prior year	(7,136,709)	(115,501,918)
c. Second prior year	(115,501,918)	(36,197,052)
d. Third prior year	(36,197,052)	62,899,547
e. Fourth prior year	62,899,547	60,680,168
f. 2011 market value adjustment not previously recognized	-	(3,003,619)
g. Total recognition	(\$12,822,710)	(\$38,259,583)
<b>8. Actuarial value of assets, end of year</b>		
a. Preliminary actuarial value of assets, end of year:		
(1) + (4g) + (5d) + (6c) + (7g)	\$7,314,683,343	\$7,063,051,856
b. Upper corridor limit: 120% * (2)	8,830,231,214	8,014,205,646
c. Lower corridor limit: 80% * (2)	5,886,820,810	5,342,803,764
d. Actuarial value of assets, end of year	\$7,314,683,343	\$7,063,051,856
9. Difference between market and actuarial value of assets	\$43,842,669	(\$384,547,151)
<b>10. Actuarial rate of return</b>	7.14%	6.74%
<b>11. Market rate of return*</b>	14.20%	7.60%
<b>12. Ratio of actuarial value to market value of assets</b>	99.40%	105.76%

\* Current year market rate of return is based on unaudited data and is supplied by the plan's investment consultant.

## Table 10

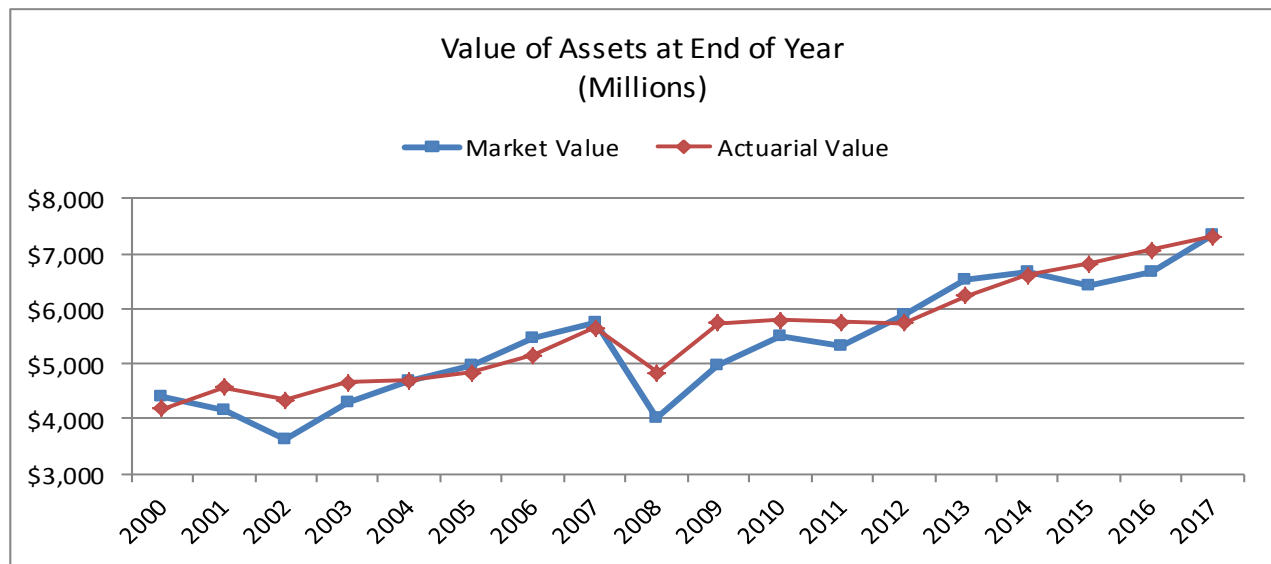
### History of Investment Returns

Plan Year (1)	Market Value (2)	Actuarial Value (3)
2000	-0.99%	16.37%
2001	-4.47%	10.54%
2002	-9.29%	-1.47%
2003	21.00%	8.72%
2004	11.54%	2.77%
2005	8.22%	5.13%
2006	12.63%	8.55%
2007	7.44%	11.41%
2008	-29.63%	-12.85%
2009	23.72%	17.89%
2010	13.80%	3.00%
2011	-0.90%	1.25%
2012	14.05%	2.22%
2013	13.53%	11.55%
2014	4.70%	8.70%
2015	-0.26%	5.87%
2016	7.60%	6.74%
2017	14.20%	7.14%

**Average returns:**

Last five years:	7.82%	7.98%
Last ten years:	5.02%	4.86%

The market returns above are gross of investment expenses and were provided by the plan's investment consultant. The actuarial returns above are based on the financial information provided by the plan's



**Table 11**  
**Solvency Test**

Valuation Date January 1	Total Active Member Contributions (1)	Inactive and Pensioner Liability (2)	Employer Financed Active Accrued Liability (3)	Actuarial Value of Assets	Percentage of Liabilities Covered by Assets		
					(1)	(2)	(3)
2005	\$840,104,000	\$2,592,159,000	\$2,103,929,000	\$4,704,299,324	100%	100%	60.5%
2006	888,544,000	2,354,500,000	1,848,710,000	4,843,861,114	100%	100%	86.6%
2007	941,572,000	2,488,504,000	2,038,153,000	5,160,601,533	100%	100%	84.9%
2008	991,444,000	2,699,505,000	2,325,036,000	5,654,022,877	100%	100%	84.4%
2009	1,036,443,231	2,796,308,000	2,319,370,769	4,835,874,981	100%	100%	43.2%
2010	1,109,001,753	2,933,630,669	2,519,698,185	5,742,541,676	100%	100%	67.3%
2011	1,161,508,226	3,178,244,317	2,515,890,340	5,799,530,934	100%	100%	58.0%
2012	1,226,273,201	3,455,740,883	2,355,172,581	5,761,221,926	100%	100%	45.8%
2013	1,286,009,555	3,724,948,051	2,308,247,120	5,749,967,972	100%	100%	32.0%
2014	1,333,532,543	4,251,120,151	2,460,394,278	6,244,501,550	100%	100%	26.8%
2015	1,394,083,171	4,600,839,298	2,375,744,013	6,609,612,342	100%	100%	25.9%
2016	1,472,111,790	4,897,375,395	2,343,866,339	6,814,919,591	100%	100%	19.0%
2017	1,491,204,773	5,255,363,783	2,292,735,275	7,063,051,856	100%	100%	13.8%
2018	1,504,862,214	5,994,581,648	2,089,209,114	7,314,683,343	100%	97%	0.0%

*Excludes Air Guard beginning in 2010*

*Effective January 1, 2010, liabilities are calculated assuming no future cost-of-living increases.*

**Table 12**  
**Schedule of Funding Progress**

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Valuation Date January 1	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL) [(3) - (2)]	Funded Ratio [(2)/(3)]	Covered Payroll	UAAL as a Percentage of Covered Payroll [(4)/(6)]
2001	\$4,190,440,151	\$3,683,174,000	(\$507,266,151)	113.77%	\$897,641,000	(56.51%)
2002	4,582,462,306	4,442,033,000	(140,429,306)	103.16%	964,121,000	(14.57%)
2003	4,352,423,802	4,718,618,000	366,194,198	92.24%	988,135,000	37.06%
2004	4,657,897,625	5,077,443,000	419,545,375	91.74%	1,032,259,000	40.64%
2005	4,704,299,324	4,902,322,000	198,022,676	95.96%	1,086,736,000	18.22%
2006	4,843,861,114	5,091,763,000	247,901,886	95.13%	1,156,400,000	21.44%
2007	5,160,601,533	5,468,229,000	307,627,467	94.37%	1,285,096,000	23.94%
2008	5,654,022,877	6,015,985,000	361,962,123	93.98%	1,462,474,000	24.75%
2009	4,835,874,981	6,152,122,000	1,316,247,019	78.60%	1,585,728,000	83.01%
2010	5,742,541,676	6,562,330,607	819,788,931	87.51%	1,697,341,384	48.30%
2011	5,799,530,934	6,855,642,883	1,056,111,949	84.59%	1,728,433,786	61.10%
2012	5,761,221,926	7,037,186,665	1,275,964,739	81.87%	1,756,856,648	72.63%
2013	5,749,967,972	7,319,204,726	1,569,236,754	78.56%	1,782,069,208	88.06%
2014	6,244,501,550	8,045,046,972	1,800,545,422	77.62%	1,782,062,471	101.04%
2015	6,609,612,342	8,370,666,482	1,761,054,140	78.96%	1,818,197,022	96.86%
2016	6,814,919,591	8,713,353,524	1,898,433,933	78.21%	1,858,678,687	102.14%
2017	7,063,051,856	9,039,303,831	1,976,251,975	78.14%	1,851,873,634	106.72%
2018	7,314,683,343	9,588,652,976	2,273,969,633	76.28%	1,784,888,475	127.40%

*Excludes Air Guard beginning in 2010*

*Effective January 1, 2010, liabilities are calculated assuming no future cost-of-living increases.*

**Table 13**

**Schedule of Contributions from the Employer(s) and Other Contributing Entities**

(1)	(2)	(3)	(4)	(5)	(6)
Fiscal Year Ending December 31	Actuarially Determined Contribution		Employer Contributions*		Percentage of Actuarially Determined Contribution Contributed [(5)/(3)]
	% of Payroll	Amount	% of Payroll	Amount	
2004	8.76%	\$90,477,000	5.87%	\$60,573,670	66.95%
2005	10.00%	108,707,000	6.00%	65,191,670	59.97%
2006	5.68%	65,714,000	6.28%	72,664,403	110.58%
2007	5.68%	73,035,000	6.47%	83,149,236	113.85%
2008	5.68%	83,036,000	6.05%	88,451,655	106.52%
2009	9.15%	145,015,000	15.39%	244,063,923**	168.32%
2010	8.06%	136,689,664	6.17%	104,757,666	76.64%
2011	7.60%	131,260,466	7.09%	122,557,906	93.37%
2012	8.04%	141,299,725	7.09%	124,648,088	88.22%
2013	8.86%	158,013,754	7.20%	128,277,269	81.18%
2014	10.28%	183,086,430	7.27%	129,627,747	70.80%
2015	9.26%	168,411,742	8.12%	144,622,373	85.87%
2016	9.38%	174,211,753	8.15%	151,488,715	86.96%
2017	9.37%	173,551,431	8.03%	148,746,669	85.71%
2018	10.74%	191,677,662	-	-	-

*Excludes Air Guard beginning December 31, 2009, including Employer Contributions of \$149,244 as of December 31, 2009.*

*Effective January 1, 2010, liabilities are calculated assuming no future cost-of-living increases.*

\* Includes other funding sources but excludes member redeposits and member service purchase contributions.

\*\* There was a \$150.6 million legislative appropriation to address the increase in school district employee pay.

**Table 14**  
**Reconciliation of Participant Data**

	<b>Active Participants</b>		<b>Vested Former</b>	<b>Retired</b>			<b>Participants</b>	
	<b>Tier 1</b>	<b>Tier 2</b>	<b>Participants</b>	<b>Participants</b>	<b>Disableds</b>	<b>Beneficiaries</b>	<b>Due Refunds</b>	<b>Total</b>
<b>Number as of January 1, 2017</b>	<b>23,388</b>	<b>12,504</b>	<b>6,291</b>	<b>23,156</b>	<b>240</b>	<b>2,372</b>	<b>22,281</b>	<b>90,232</b>
New participants	-	3,125	-	-	-	17	440	3,582
Vested terminations	(765)	(177)	959	-	-	-	(17)	-
Retirements	(1,227)	(11)	(326)	1,568	-	-	(4)	-
Disability	(7)	-	-	-	7	-	-	-
Deceased with beneficiary	(16)	-	(8)	(186)	(4)	214	-	-
Deceased without beneficiary	(18)	(5)	(20)	(419)	(5)	(145)	(43)	(655)
Due refunds	(23)	(1,597)	(2)	-	-	-	1,622	-
Lump sum payoffs	(174)	(512)	(158)	-	-	-	(669)	(1,513)
Rehires/return to active	140	388	(144)	(1)	-	-	(329)	54
Certain period expired	-	-	-	-	-	(6)	-	(6)
Reclassifications	(12)	12	(1)	-	-	-	-	(1)
Data corrections	-	-	-	-	-	-	-	-
<b>Number as of January 1, 2018</b>	<b>21,286</b>	<b>13,727</b>	<b>6,591</b>	<b>24,118</b>	<b>238</b>	<b>2,452</b>	<b>23,281</b>	<b>91,693</b>



**Table 15**  
**Demographic Statistics**

	<b>January 1</b>		
	<b>2018</b>	<b>2017</b>	<b>Change</b>
<u><b>Active Participants</b></u>			
Number	35,013	35,892	-2.4%
<i>Vested</i>	23,850	23,931	
<i>Not vested</i>	11,163	11,961	
Average age (years)	46.31	46.26	0.1%
Average service (years)	10.05	9.98	0.7%
Average entry age (years)	36.26	36.28	-0.1%
Total payroll*	\$1,784,888,475	\$1,851,873,634	-3.6%
Average payroll*	\$50,978	\$51,596	-1.2%
Total employee contributions with interest	\$1,504,862,214	\$1,491,204,773	0.9%
Average employee contributions with interest	\$42,980	\$41,547	3.4%
<u><b>Vested Former Participants</b></u>			
Number	6,591	6,291	4.8%
Average age (years)	51.39	51.64	-0.5%
Total employee contributions with interest	\$221,045,319	\$208,143,994	6.2%
Average employee contributions with interest	\$33,537	\$33,086	1.4%
<u><b>Service Retirees</b></u>			
Number	24,118	23,156	4.2%
Average age (years)	71.88	71.71	0.2%
Total annual benefits	\$489,298,986	\$458,510,406	6.7%
Average annual benefit	\$20,288	\$19,801	2.5%
<u><b>Disability Retirees</b></u>			
Number	238	240	-0.8%
Average age (years)	64.79	64.19	0.9%
Total annual benefits	\$3,724,336	\$3,733,643	-0.2%
Average annual benefit	\$15,648	\$15,557	0.6%
<u><b>Beneficiaries</b></u>			
Number	2,452	2,372	3.4%
Average age (years)	75.87	75.92	-0.1%
Total annual benefits	\$35,091,325	\$32,796,262	7.0%
Average annual benefit	\$14,311	\$13,826	3.5%
<u><b>Participants Due Refunds</b></u>			
Number	23,281	22,281	4.5%
Total Refunds Due	\$59,664,095	\$54,219,338	10.0%

\* Projected payroll for the upcoming valuation year

## Table 16

### Distribution of Male Active Members by Age and by Years of Service

Average Age = 47.0      Average Service = 10.3

Age Last Birthday		Whole Years of Service at Valuation Date							Totals
		0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
<b>Less than 20</b>	Count	14	-	-	-	-	-	-	14
	Avg. Salary	\$25,515	-	-	-	-	-	-	\$25,515
<b>20-24</b>	Count	315	3	-	-	-	-	-	318
	Avg. Salary	33,642	*	-	-	-	-	-	33,751
<b>25-29</b>	Count	773	136	3	-	-	-	-	912
	Avg. Salary	42,840	\$46,762	*	-	-	-	-	43,477
<b>30-34</b>	Count	742	471	90	2	-	-	-	1,305
	Avg. Salary	47,936	57,872	\$59,868	*	-	-	-	52,344
<b>35-39</b>	Count	581	492	335	61	1	-	-	1,470
	Avg. Salary	50,175	61,178	65,845	\$67,083	*	-	-	58,136
<b>40-44</b>	Count	471	360	376	239	44	1	-	1,491
	Avg. Salary	49,112	63,538	65,545	71,621	\$70,136	*	-	60,973
<b>45-49</b>	Count	477	308	272	273	218	52	3	1,603
	Avg. Salary	46,722	59,826	66,073	70,621	77,679	\$73,222	*	61,674
<b>50-54</b>	Count	422	303	287	218	197	235	71	1,733
	Avg. Salary	48,177	57,425	61,372	66,260	74,049	79,494	\$69,703	62,323
<b>55-59</b>	Count	408	287	285	237	200	207	222	1,846
	Avg. Salary	44,612	52,935	58,928	63,692	70,499	70,830	76,196	60,109
<b>60-64</b>	Count	281	247	224	164	103	121	177	1,317
	Avg. Salary	44,196	54,350	57,707	60,861	65,592	75,239	80,141	59,830
<b>65-69</b>	Count	147	91	84	56	30	30	57	495
	Avg. Salary	32,751	47,506	59,950	58,905	64,249	72,086	74,993	52,195
<b>70 &amp; Over</b>	Count	66	36	28	16	7	4	20	177
	Avg. Salary	25,774	35,073	39,772	44,634	45,722	74,554	76,512	39,209
<b>Totals</b>	Count	<b>4,697</b>	<b>2,734</b>	<b>1,984</b>	<b>1,266</b>	<b>800</b>	<b>650</b>	<b>550</b>	<b>12,681</b>
	Avg. Salary	<b>\$45,066</b>	<b>\$57,335</b>	<b>\$62,361</b>	<b>\$66,443</b>	<b>\$72,212</b>	<b>\$75,034</b>	<b>\$76,383</b>	<b>\$57,158</b>

Average salary represents annualized salary earned in 2017 and is not shown for cells with counts less than or equal to three participants

## Table 17

### Distribution of Female Active Members by Age and by Years of Service

Average Age = 45.9      Average Service = 9.9

Age Last Birthday		Whole Years of Service at Valuation Date							Totals
		0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
<b>Less than 20</b>	Count	36	-	-	-	-	-	-	36
	Avg. Salary	\$17,340	-	-	-	-	-	-	\$17,340
<b>20-24</b>	Count	629	3	-	-	-	-	-	632
	Avg. Salary	28,908	*	-	-	-	-	-	28,929
<b>25-29</b>	Count	1,473	241	4	-	-	-	-	1,718
	Avg. Salary	38,327	\$47,291	\$31,242	-	-	-	-	39,568
<b>30-34</b>	Count	1,411	881	193	1	-	-	-	2,486
	Avg. Salary	37,206	51,864	54,652	*	-	-	-	43,763
<b>35-39</b>	Count	1,310	735	621	111	-	-	-	2,777
	Avg. Salary	34,760	50,046	58,236	\$59,158	-	-	-	45,031
<b>40-44</b>	Count	1,075	726	535	409	66	3	-	2,814
	Avg. Salary	35,585	47,156	55,613	63,639	\$61,003	*	-	47,088
<b>45-49</b>	Count	864	660	585	423	303	66	3	2,904
	Avg. Salary	35,982	44,212	51,699	62,110	67,792	\$69,883	*	48,946
<b>50-54</b>	Count	694	488	544	457	281	260	80	2,804
	Avg. Salary	35,377	43,393	47,175	51,577	60,653	68,339	\$63,486	48,093
<b>55-59</b>	Count	572	461	569	553	413	307	281	3,156
	Avg. Salary	34,265	40,367	45,541	47,106	54,201	62,645	65,979	47,632
<b>60-64</b>	Count	358	316	387	368	317	226	279	2,251
	Avg. Salary	33,123	38,907	43,504	48,384	49,531	54,297	65,626	46,680
<b>65-69</b>	Count	92	92	99	90	73	59	79	584
	Avg. Salary	23,597	42,945	41,690	45,876	45,364	49,819	62,929	43,836
<b>70 &amp; Over</b>	Count	49	27	27	22	14	11	20	170
	Avg. Salary	15,127	27,473	40,801	32,102	35,011	41,340	53,129	31,167
<b>Totals</b>	Count	<b>8,563</b>	<b>4,630</b>	<b>3,564</b>	<b>2,434</b>	<b>1,467</b>	<b>932</b>	<b>742</b>	<b>22,332</b>
	Avg. Salary	<b>\$35,217</b>	<b>\$46,255</b>	<b>\$50,638</b>	<b>\$53,897</b>	<b>\$56,918</b>	<b>\$61,682</b>	<b>\$64,913</b>	<b>\$45,519</b>

Average salary represents annualized salary earned in 2017 and is not shown for cells with counts less than or equal to three participants

## Table 18

### Distribution of Total Active Members by Age and by Years of Service

Average Age = 46.3      Average Service = 10.1

Age Last Birthday		Whole Years of Service at Valuation Date							Totals
		0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
<b>Less than 20</b>	Count	50	-	-	-	-	-	-	50
	Avg. Salary	\$19,629	-	-	-	-	-	-	\$19,629
<b>20-24</b>	Count	944	6	-	-	-	-	-	950
	Avg. Salary	30,488	\$39,213	-	-	-	-	-	30,543
<b>25-29</b>	Count	2,246	377	7	-	-	-	-	2,630
	Avg. Salary	39,880	47,100	\$43,083	-	-	-	-	40,923
<b>30-34</b>	Count	2,153	1,352	283	3	-	-	-	3,791
	Avg. Salary	40,904	53,957	56,311	*	-	-	-	46,717
<b>35-39</b>	Count	1,891	1,227	956	172	1	-	-	4,247
	Avg. Salary	39,496	54,510	60,903	\$61,968	*	-	-	49,567
<b>40-44</b>	Count	1,546	1,086	911	648	110	4	-	4,305
	Avg. Salary	39,706	52,586	59,712	66,583	\$64,656	\$66,673	-	51,897
<b>45-49</b>	Count	1,341	968	857	696	521	118	6	4,507
	Avg. Salary	39,802	49,180	56,261	65,448	71,929	71,354	\$59,883	53,473
<b>50-54</b>	Count	1,116	791	831	675	478	495	151	4,537
	Avg. Salary	40,217	48,768	52,078	56,319	66,174	73,635	66,410	53,528
<b>55-59</b>	Count	980	748	854	790	613	514	503	5,002
	Avg. Salary	38,573	45,189	50,008	52,082	59,518	65,941	70,488	52,237
<b>60-64</b>	Count	639	563	611	532	420	347	456	3,568
	Avg. Salary	37,992	45,682	48,711	52,230	53,470	61,600	71,260	51,534
<b>65-69</b>	Count	239	183	183	146	103	89	136	1,079
	Avg. Salary	29,227	45,213	50,071	50,874	50,865	57,324	67,985	47,671
<b>70 &amp; Over</b>	Count	115	63	55	38	21	15	40	347
	Avg. Salary	21,237	31,816	40,277	37,379	38,581	50,197	64,821	35,269
<b>Totals</b>	Count	<b>13,260</b>	<b>7,364</b>	<b>5,548</b>	<b>3,700</b>	<b>2,267</b>	<b>1,582</b>	<b>1,292</b>	<b>35,013</b>
	Avg. Salary	<b>\$38,705</b>	<b>\$50,369</b>	<b>\$54,830</b>	<b>\$58,190</b>	<b>\$62,315</b>	<b>\$67,168</b>	<b>\$69,796</b>	<b>\$49,735</b>

Average salary represents annualized salary earned in 2017 and is not shown for cells with counts less than or equal to three participants

**Table 19**

**Distribution of Male Deferred Members by Age and by Years of Service**

Average Age = 51.1      Average Service = 8.7

Age Last Birthday	Whole Years of Service at Valuation Date							Totals
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
Less than 20	-	-	-	-	-	-	-	-
20-24	1	-	-	-	-	-	-	1
25-29	18	13	-	-	-	-	-	31
30-34	46	70	8	-	-	-	-	124
35-39	60	130	29	1	-	-	-	220
40-44	43	137	41	18	1	-	-	241
45-49	59	147	54	21	8	-	-	289
50-54	44	166	79	27	13	2	-	331
55-59	84	187	96	47	28	11	1	454
60-64	47	103	51	18	6	1	1	227
65-69	31	53	14	5	4	-	-	107
70 & Over	14	25	6	5	-	2	-	52
<b>Totals</b>	<b>448</b>	<b>1,031</b>	<b>378</b>	<b>142</b>	<b>60</b>	<b>16</b>	<b>2</b>	<b>2,077</b>

## Table 20

### Distribution of Female Deferred Members by Age and by Years of Service

Average Age = 51.5      Average Service = 8.6

Age Last Birthday	Whole Years of Service at Valuation Date							Totals
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
Less than 20	-	-	-	-	-	-	-	-
20-24	-	-	-	-	-	-	-	-
25-29	48	23	-	-	-	-	-	71
30-34	132	179	5	-	-	-	-	316
35-39	121	269	38	2	-	-	-	430
40-44	108	242	73	13	1	-	-	437
45-49	110	324	111	44	11	-	-	600
50-54	97	347	159	74	20	8	1	706
55-59	149	428	236	119	59	20	2	1,013
60-64	97	279	119	47	25	5	4	576
65-69	52	121	32	14	9	4	2	234
70 & Over	40	71	17	2	1	-	-	131
<b>Totals</b>	<b>954</b>	<b>2,283</b>	<b>790</b>	<b>315</b>	<b>126</b>	<b>37</b>	<b>9</b>	<b>4,514</b>

**Table 21****Distribution of Total Deferred Members by Age and by Years of Service**

Average Age = 51.4      Average Service = 8.6

Age Last Birthday	Whole Years of Service at Valuation Date							Totals
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
Less than 20	-	-	-	-	-	-	-	-
20-24	1	-	-	-	-	-	-	1
25-29	66	36	-	-	-	-	-	102
30-34	178	249	13	-	-	-	-	440
35-39	181	399	67	3	-	-	-	650
40-44	151	379	114	31	2	-	-	678
45-49	169	471	165	65	19	-	-	889
50-54	141	513	238	101	33	10	1	1,037
55-59	233	615	332	166	87	31	3	1,467
60-64	144	382	170	65	31	6	5	803
65-69	83	174	46	19	13	4	2	341
70 & Over	54	96	23	7	1	2	-	183
<b>Totals</b>	<b>1,402</b>	<b>3,314</b>	<b>1,168</b>	<b>457</b>	<b>186</b>	<b>53</b>	<b>11</b>	<b>6,591</b>

**Table 22**  
**Schedule of Pension Recipients Added to and Removed from Rolls**

Fiscal Year Ending December 31	Added to Rolls*		Removed from Rolls		Total		Percent Increase in Annual Pension Benefits	Average Annual Pension Benefit
	Count	Annual Pension Benefits	Count	Annual Pension Benefits	Count	Annual Pension Benefits		
2008	1,290	\$26,985,322	552	\$3,650,746	18,333	\$268,901,376	9.50%	\$14,668
2009	1,160	24,062,484	577	6,292,131	18,916	286,671,729	6.61%	15,155
2010	1,388	31,055,004	562	6,314,155	19,742	311,412,579	8.63%	15,774
2011	1,538	34,517,321	592	7,019,999	20,688	338,909,901	8.83%	16,382
2012	1,497	35,646,627	585	6,920,227	21,600	367,636,301	8.48%	17,020
2013	1,745	39,633,549	614	8,227,809	22,731	399,042,042	8.54%	17,555
2014	1,755	42,076,101	726	9,207,206	23,760	431,910,937	8.24%	18,178
2015	1,657	38,445,600	689	9,453,053	24,728	460,903,484	6.71%	18,639
2016	1,768	43,327,957	728	9,191,130	25,768	495,040,311	7.41%	19,211
2017	1,806	43,470,131	766	10,395,795	26,808	528,114,647	6.68%	19,700

\* Includes cost-of-living increases



**Table 23**  
**Retired and Disabled Members by Option Code**

Option Code*	Count			Monthly Benefit			Count elected self-funded COLA**		
	Male	Female	Total	Male	Female	Total	1%	2%	3%
<b>1</b>	2,036	6,332	8,368	\$3,571,471	\$8,839,704	\$12,411,175	21	10	21
<b>2</b>	4,474	3,318	7,792	9,306,744	5,350,497	14,657,241	12	13	23
<b>2P</b>	1,389	1,906	3,295	2,556,113	3,368,426	5,924,540	6	9	13
<b>3</b>	501	548	1,049	1,177,200	901,626	2,078,826	2	2	1
<b>3P</b>	300	572	872	721,164	1,217,688	1,938,852	4	4	6
<b>4a</b>	319	584	903	499,162	795,868	1,295,030	3	-	5
<b>4b</b>	38	59	97	71,477	88,195	159,672	3	3	2
<b>5</b>	503	1,477	1,980	763,707	1,856,234	2,619,941	6	4	3
<b>Total</b>	<b>9,560</b>	<b>14,796</b>	<b>24,356</b>	<b>\$18,667,039</b>	<b>\$22,418,238</b>	<b>\$41,085,277</b>	<b>57</b>	<b>45</b>	<b>74</b>
<b>Beneficiaries</b>	<b>537</b>	<b>1,915</b>	<b>2,452</b>	<b>\$554,751</b>	<b>\$2,369,526</b>	<b>\$2,924,277</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Grand Total</b>	<b>10,097</b>	<b>16,711</b>	<b>26,808</b>	<b>\$19,221,790</b>	<b>\$24,787,764</b>	<b>\$44,009,554</b>	<b>57</b>	<b>45</b>	<b>74</b>

\*See optional forms of payment in Appendix B

\*\*Option totals in left portion of the table include these counts of members who elected a self-funded COLA option.

**Table 24**  
**Pensioners by Monthly Benefit and Option Code**

Males	Option Code*								
Benefit Amount	1	2	2P	3	3P	4a**	4b	5	Total
Under \$200	100	147	59	5	5	29	-	107	452
\$200-\$399	202	344	138	17	19	39	7	150	916
\$400-\$599	219	332	134	23	12	43	4	138	905
\$600-\$799	181	302	107	26	15	31	3	100	765
\$800-\$999	157	273	98	20	13	20	2	87	670
\$1,000-\$1,499	243	547	171	80	35	53	6	133	1,268
\$1,500-\$1,999	216	493	124	54	30	32	3	77	1,029
\$2,000-\$2,499	171	483	150	73	41	19	4	69	1,010
\$2,500 & over	547	1,553	408	203	130	70	9	162	3,082
<b>Total</b>	<b>2,036</b>	<b>4,474</b>	<b>1,389</b>	<b>501</b>	<b>300</b>	<b>336</b>	<b>38</b>	<b>1,023</b>	<b>10,097</b>
Females									
Benefit Amount	1	2	2P	3	3P	4a**	4b	5	Total
Under \$200	489	222	83	17	13	62	4	302	1,192
\$200-\$399	860	402	195	52	28	99	9	467	2,112
\$400-\$599	755	323	160	48	36	80	6	438	1,846
\$600-\$799	623	241	137	53	34	59	6	334	1,487
\$800-\$999	491	238	139	34	36	41	6	279	1,264
\$1,000-\$1,499	904	496	269	94	80	87	9	512	2,451
\$1,500-\$1,999	628	318	202	79	65	37	6	349	1,684
\$2,000-\$2,499	468	280	193	54	64	36	-	233	1,328
\$2,500 & over	1,114	798	528	117	216	108	13	453	3,347
<b>Total</b>	<b>6,332</b>	<b>3,318</b>	<b>1,906</b>	<b>548</b>	<b>572</b>	<b>609</b>	<b>59</b>	<b>3,367</b>	<b>16,711</b>
Males & Females									
Benefit Amount	1	2	2P	3	3P	4a**	4b	5	Total
Under \$200	589	369	142	22	18	91	4	409	1,644
\$200-\$399	1,062	746	333	69	47	138	16	617	3,028
\$400-\$599	974	655	294	71	48	123	10	576	2,751
\$600-\$799	804	543	244	79	49	90	9	434	2,252
\$800-\$999	648	511	237	54	49	61	8	366	1,934
\$1,000-\$1,499	1,147	1,043	440	174	115	140	15	645	3,719
\$1,500-\$1,999	844	811	326	133	95	69	9	426	2,713
\$2,000-\$2,499	639	763	343	127	105	55	4	302	2,338
\$2,500 & over	1,661	2,351	936	320	346	178	22	615	6,429
<b>Total</b>	<b>8,368</b>	<b>7,792</b>	<b>3,295</b>	<b>1,049</b>	<b>872</b>	<b>945</b>	<b>97</b>	<b>4,390</b>	<b>26,808</b>

\*Options include those who elected a self-funded COLA option.

\*\*Option 4a includes 42 beneficiaries who are receiving a certain only benefit.

**Table 25**  
**Pensioners by Age and Option Code**

Average Age Male = 72.2

Average Age Female = 72.2

Average Age Total = 72.2

<b>Males</b>	<b>Option Code*</b>								
<b>Age Last Birthday</b>	<b>1</b>	<b>2</b>	<b>2P</b>	<b>3</b>	<b>3P</b>	<b>4a**</b>	<b>4b</b>	<b>5</b>	<b>Total</b>
<b>Under 50</b>	3	1	-	-	1	8	-	9	22
<b>50-54</b>	11	15	9	1	1	1	1	9	48
<b>55-59</b>	70	167	59	10	3	16	6	33	364
<b>60-64</b>	297	693	232	55	42	42	16	126	1,503
<b>65-69</b>	452	1,092	447	81	84	78	10	206	2,450
<b>70-74</b>	443	1,007	362	100	86	62	4	207	2,271
<b>75-79</b>	360	721	184	87	54	59	1	185	1,651
<b>80-84</b>	225	451	75	84	21	42	-	116	1,014
<b>85 &amp; over</b>	175	327	21	83	8	28	-	132	774
<b>Total</b>	<b>2,036</b>	<b>4,474</b>	<b>1,389</b>	<b>501</b>	<b>300</b>	<b>336</b>	<b>38</b>	<b>1,023</b>	<b>10,097</b>
<b>Females</b>									
<b>Age Last Birthday</b>	<b>1</b>	<b>2</b>	<b>2P</b>	<b>3</b>	<b>3P</b>	<b>4a**</b>	<b>4b</b>	<b>5</b>	<b>Total</b>
<b>Under 50</b>	2	3	-	-	-	13	-	25	43
<b>50-54</b>	27	15	12	1	2	1	2	22	82
<b>55-59</b>	206	175	106	18	30	22	8	66	631
<b>60-64</b>	894	672	462	102	127	66	25	340	2,688
<b>65-69</b>	1,463	1,012	694	145	191	142	18	585	4,250
<b>70-74</b>	1,337	681	438	114	126	147	5	627	3,475
<b>75-79</b>	969	372	149	79	71	99	-	587	2,326
<b>80-84</b>	714	220	39	35	22	59	1	517	1,607
<b>85 &amp; over</b>	720	168	6	54	3	60	-	598	1,609
<b>Total</b>	<b>6,332</b>	<b>3,318</b>	<b>1,906</b>	<b>548</b>	<b>572</b>	<b>609</b>	<b>59</b>	<b>3,367</b>	<b>16,711</b>
<b>Males &amp; Females</b>									
<b>Age Last Birthday</b>	<b>1</b>	<b>2</b>	<b>2P</b>	<b>3</b>	<b>3P</b>	<b>4a**</b>	<b>4b</b>	<b>5</b>	<b>Total</b>
<b>Under 50</b>	5	4	-	-	1	21	-	34	65
<b>50-54</b>	38	30	21	2	3	2	3	31	130
<b>55-59</b>	276	342	165	28	33	38	14	99	995
<b>60-64</b>	1,191	1,365	694	157	169	108	41	466	4,191
<b>65-69</b>	1,915	2,104	1,141	226	275	220	28	791	6,700
<b>70-74</b>	1,780	1,688	800	214	212	209	9	834	5,746
<b>75-79</b>	1,329	1,093	333	166	125	158	1	772	3,977
<b>80-84</b>	939	671	114	119	43	101	1	633	2,621
<b>85 &amp; over</b>	895	495	27	137	11	88	-	730	2,383
<b>Total</b>	<b>8,368</b>	<b>7,792</b>	<b>3,295</b>	<b>1,049</b>	<b>872</b>	<b>945</b>	<b>97</b>	<b>4,390</b>	<b>26,808</b>

\*Options include those who elected a self-funded COLA option.

\*\*Option 4a includes 42 beneficiaries who are receiving a certain only benefit.

**Table 26**  
**Pensions Awarded in 2017 by Option Code**

Average Age = 62.9

Males & Females	Option Code*								
Benefit Amount	1	2	2P	3	3P	4a**	4b	5	Total
Under \$200	21	11	5	1	1	0	0	27	66
\$200-\$399	48	42	23	2	3	4	6	44	172
\$400-\$599	51	27	21	2	2	2	4	37	146
\$600-\$799	40	30	13	6	4	3	2	25	123
\$800-\$999	39	36	16	2	4	5	3	27	132
\$1,000-\$1,499	67	73	41	8	5	11	7	55	267
\$1,500-\$1,999	59	54	23	14	3	2	4	25	184
\$2,000-\$2,499	41	50	19	3	6	1	1	28	149
\$2,500 & over	134	223	82	22	28	13	5	60	567
<b>Total</b>	<b>500</b>	<b>546</b>	<b>243</b>	<b>60</b>	<b>56</b>	<b>41</b>	<b>32</b>	<b>328</b>	<b>1,806</b>
Males & Females									
Age Last Birthday	1	2	2P	3	3P	4a**	4b	5	Total
Under 50	0	0	0	0	1	4	0	7	12
50-54	18	11	11	0	3	0	2	6	51
55-59	68	74	32	9	8	5	6	20	222
60-64	231	272	113	33	23	14	16	69	771
65-69	140	151	74	15	16	15	4	88	503
70-74	33	32	10	2	5	2	3	40	127
75-79	9	4	3	0	0	1	1	43	61
80-84	1	2	0	0	0	0	0	32	35
85 & over	0	0	0	1	0	0	0	23	24
<b>Total</b>	<b>500</b>	<b>546</b>	<b>243</b>	<b>60</b>	<b>56</b>	<b>41</b>	<b>32</b>	<b>328</b>	<b>1,806</b>

\*Options include those who elected a self-funded COLA option

\*\*Option 4a includes 42 beneficiaries who are receiving a certain only benefit.

## Table 27

### Retirees and Disabled Members by Service at Retirement and Years Since Retirement

(Average Monthly Benefit)

Average Service at Retirement = 20.0      Average Years Since Retirement = 11.4

Service at Retirement		Years Elapsed Since Retirement							Totals
		0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
<b>Less than 5</b>	Count	213	254	204	116	82	98	79	1,046
	Avg. Benefit	\$310	\$259	\$319	\$1,196	\$168	\$157	\$127	\$224
<b>5-9</b>	Count	1,134	918	634	410	333	281	232	3,942
	Avg. Benefit	\$523	\$445	\$386	\$368	\$323	\$308	\$281	\$420
<b>10-14</b>	Count	1,101	756	556	463	388	306	206	3,776
	Avg. Benefit	\$940	\$807	\$686	\$641	\$616	\$571	\$470	\$751
<b>15-19</b>	Count	935	727	581	505	449	217	157	3,571
	Avg. Benefit	\$1,426	\$1,295	\$1,067	\$983	\$941	\$900	\$749	\$1,155
<b>20-24</b>	Count	953	800	599	438	356	167	97	3,410
	Avg. Benefit	\$2,113	\$1,903	\$1,530	\$1,385	\$1,325	\$1,220	\$1,098	\$1,713
<b>25-29</b>	Count	1,069	1,091	716	469	302	113	78	3,838
	Avg. Benefit	\$2,814	\$2,703	\$2,223	\$2,047	\$1,929	\$1,774	\$1,538	\$2,452
<b>30-34</b>	Count	1,052	934	564	359	291	116	49	3,365
	Avg. Benefit	\$3,726	\$3,486	\$2,946	\$2,647	\$2,687	\$2,643	\$2,150	\$3,263
<b>35 &amp; Over</b>	Count	715	347	153	65	79	43	6	1,408
	Avg. Benefit	\$4,698	\$4,238	\$3,620	\$3,175	\$3,389	\$3,027	\$2,366	\$4,263
<b>Totals</b>	Count	<b>7,172</b>	<b>5,827</b>	<b>4,007</b>	<b>2,825</b>	<b>2,280</b>	<b>1,341</b>	<b>904</b>	<b>24,356</b>
	Avg. Benefit	<b>\$2,137</b>	<b>\$1,926</b>	<b>\$1,500</b>	<b>\$1,307</b>	<b>\$1,266</b>	<b>\$979</b>	<b>\$703</b>	<b>\$1,687</b>

## Table 28

### Retirees and Disabled Members by Year of Retirement

January 1, 2018 Total = 24,356

Year of Retirement	Count	Year of Retirement	Count
Under 1961	-	1989	225
1961	-	1990	244
1962	-	1991	266
1963	-	1992	373
1964	-	1993	336
1965	-	1994	385
1966	-	1995	662
1967	-	1996	447
1968	-	1997	451
1969	-	1998	468
1970	-	1999	496
1971	1	2000	571
1972	4	2001	638
1973	2	2002	620
1974	8	2003	715
1975	9	2004	832
1976	12	2005	761
1977	22	2006	789
1978	29	2007	907
1979	37	2008	1,040
1980	36	2009	936
1981	51	2010	1,140
1982	49	2011	1,327
1983	61	2012	1,369
1984	85	2013	1,421
1985	104	2014	1,488
1986	144	2015	1,439
1987	241	2016	1,481
1988	221	2017*	1,413

\*May include retirements as of January 1, 2018

**Table 29**  
**Thirty Year Projected Benefit Payments**

<b>Year Ending December 31</b>	<b>Actives</b>	<b>Retirees*</b>	<b>Total</b>
<b>2018</b>	\$ 31,426,889	\$ 534,046,166	\$ 565,473,055
<b>2019</b>	57,300,924	530,488,977	587,789,902
<b>2020</b>	83,445,374	526,506,035	609,951,409
<b>2021</b>	110,189,758	522,117,099	632,306,857
<b>2022</b>	140,038,380	516,833,061	656,871,441
<b>2023</b>	170,492,792	510,360,164	680,852,956
<b>2024</b>	201,207,805	503,448,317	704,656,122
<b>2025</b>	231,695,047	495,768,940	727,463,987
<b>2026</b>	262,242,016	487,442,312	749,684,328
<b>2027</b>	292,746,678	478,333,892	771,080,570
<b>2028</b>	323,121,827	468,554,271	791,676,098
<b>2029</b>	353,570,554	458,504,758	812,075,312
<b>2030</b>	384,056,825	447,822,335	831,879,161
<b>2031</b>	414,559,121	436,320,687	850,879,809
<b>2032</b>	444,917,082	423,834,014	868,751,095
<b>2033</b>	475,156,441	410,558,960	885,715,401
<b>2034</b>	505,300,453	396,800,744	902,101,196
<b>2035</b>	535,431,447	382,277,801	917,709,249
<b>2036</b>	565,319,735	366,881,478	932,201,213
<b>2037</b>	594,713,971	350,952,001	945,665,972
<b>2038</b>	623,109,346	334,553,007	957,662,353
<b>2039</b>	650,458,803	317,794,548	968,253,351
<b>2040</b>	676,722,731	300,758,976	977,481,707
<b>2041</b>	701,331,927	283,214,687	984,546,614
<b>2042</b>	724,072,433	265,557,451	989,629,884
<b>2043</b>	744,835,550	247,609,740	992,445,291
<b>2044</b>	762,897,343	229,660,008	992,557,352
<b>2045</b>	777,939,242	211,882,882	989,822,124
<b>2046</b>	789,326,593	194,381,608	983,708,202
<b>2047</b>	797,121,623	177,336,902	974,458,525

\* Includes Disabled Members, Beneficiaries, and Deferred Vested Members. Retirement benefit payments for deferred vested members are assumed to commence at age 60 (age 65 for Tier 2).

## APPENDIX A

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### SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS



## Summary of Actuarial Assumptions and Methods

The following methods and assumptions were used in preparing the January 1, 2018 actuarial valuation report.

### 1. Valuation Date

The valuation date for any given year is January 1<sup>st</sup>, the first day of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

### 2. Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal (EAN) actuarial cost method, amortized as a level percentage of payroll. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) the rate that will amortize the unfunded actuarial accrued liability (UAAL).

- a. The valuation is prepared on the projected benefit basis, under which the present value, at the investment return rate assumed to be earned in the future (currently 7.00%), of each participant's expected benefit payable at retirement or death is determined, based on his/her age, service, sex and compensation. The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his/her terminating with a service, disability, or survivor's benefit. Future salary increases are also anticipated. The present value of the expected benefits payable for the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Fund on account of the present group of participants and beneficiaries.
- b. The employer contributions required to support the benefits of the Fund are determined using a level funding approach, and consist of a normal cost contribution and a unfunded accrued liability contribution.
- c. The normal cost contribution is determined using the "entry age normal" actuarial cost method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each new participant during the entire period of his/her anticipated covered service, would be required to meet the cost of all benefits payable on his/her behalf based on the benefits provisions applicable for the individual member.
- d. The unfunded actuarial accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability and amortizing the result over 30 years from the valuation date.

### 3. Actuarial Value of Assets

The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of investment expenses. An adjustment is made if the actuarial value is not within 20% of the Market Value. For any year following a year in which the 20% of market value adjustment was applied, the actuarial value is determined as if the adjustment was not applied in the previous year.

### 4. Economic Assumptions

#### a. Investment return

7.00% per year, compounded annually, composed of an assumed 2.25% inflation rate and a 4.75% net real rate of return. This rate represents the assumed return, net of investment expenses.

#### b. Salary increase rate

Service	Rate	Service	Rate
1	6.50%	14	3.50%
2	6.50%	15	3.25%
3	6.50%	16	3.25%
4	6.00%	17	3.25%
5	5.25%	18	3.25%
6	4.75%	19	3.00%
7	4.25%	20	3.00%
8	4.00%	21	2.75%
9	4.00%	22	2.75%
10	4.00%	23	2.75%
11	3.75%	24	2.75%
12	3.50%	25	2.50%
13	3.50%	25+	2.50%

#### c. Payroll growth rate

In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 2.50% per year. This increase rate is solely due to the effect of inflation on salaries, with no allowance for future membership growth.

#### d. Cost-of-Living adjustment

No cost-of-living adjustment is assumed since the policy for providing the benefit requires Board approval to make the recommendation to the Joint Appropriations Committee and the funded level of the plan shows a cost-of-living requirement would not be permitted.

## 5. Demographic Assumptions

### a. Mortality

Healthy Pre-Retirement Mortality:

RP-2014 Employee Mortality Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 100%

Healthy Post-Retirement Mortality:

RP-2014 Healthy Annuitant Mortality Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 88%

Disabled Mortality

RP-2014 Disabled Mortality Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 100%

Age	Pre-Retirement		Post-Retirement		Disabled	
	Projected to 2018 using Scale MP-2017					
	Male	Female	Male	Female	Male	Female
20	0.04%	0.02%	0.04%	0.01%	0.05%	0.02%
25	0.05%	0.02%	0.06%	0.03%	0.20%	0.09%
30	0.05%	0.02%	0.09%	0.06%	0.51%	0.24%
35	0.06%	0.03%	0.13%	0.09%	0.91%	0.45%
40	0.06%	0.04%	0.19%	0.14%	1.31%	0.68%
45	0.09%	0.06%	0.27%	0.18%	1.63%	0.90%
50	0.16%	0.11%	0.39%	0.24%	1.94%	1.16%
55	0.27%	0.17%	0.56%	0.32%	2.28%	1.46%
60	0.47%	0.25%	0.78%	0.47%	2.68%	1.74%
65	0.83%	0.36%	1.11%	0.70%	3.19%	2.06%
70	1.35%	0.61%	1.64%	1.09%	3.94%	2.71%
75			2.58%	1.77%	5.23%	3.95%
80			4.31%	2.98%	7.38%	5.94%
85			7.50%	5.22%	10.97%	8.86%
90			13.21%	9.25%	16.82%	13.02%
95			21.17%	15.41%	23.94%	19.15%
100			30.66%	23.44%	31.90%	27.35%

b. Disability and Withdrawal

Age	Disability		Withdrawal	
	Male	Female	Ultimate	
			Male	Female
20	0.01%	0.01%	11.00%	10.00%
25	0.01%	0.01%	11.00%	10.00%
30	0.01%	0.01%	6.00%	6.00%
35	0.01%	0.01%	5.00%	5.00%
40	0.01%	0.01%	4.00%	5.00%
45	0.02%	0.02%	4.00%	5.00%
50	0.12%	0.05%	3.00%	4.00%
55	0.24%	0.12%	3.00%	4.00%
60	0.24%	0.24%	3.00%	4.00%

Withdrawal		
Service	First five years	
	Male	Female
1	22%	25%
2	18%	21%
3	14%	15%
4	13%	15%
5	13%	14%

c. Retirement Rates

Age	Retirement	
	Unreduced	Reduced
<50	15.0%	1.0%
50	15.0%	0.5%
51	15.0%	0.5%
52	15.0%	0.5%
53	15.0%	0.5%
54	15.0%	0.5%
55	17.0%	1.0%
56	17.0%	1.0%
57	15.0%	1.0%
58	15.0%	1.0%
59	15.0%	2.5%
60	13.0%	2.5%
61	13.0%	2.5%
62	18.0%	2.5%
63	15.0%	2.5%
64	15.0%	2.5%
65	25.0%	
66	30.0%	
67	28.0%	
68	25.0%	
69	25.0%	
70	15.0%	
71	15.0%	
72	15.0%	
73	15.0%	
74	15.0%	
75	15.0%	
76	15.0%	
77	15.0%	
78	15.0%	
79	15.0%	
80+	100.0%	

## 6. Other Assumptions

- a. Percent married: 85.00% of employees are assumed to be married. (No beneficiaries other than the spouse assumed.)
- b. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
- c. Percent electing annuity on death (when eligible): All of the spouses of vested, married participants are assumed to elect an annuity.
- d. Percent electing deferred termination benefit: Vested terminating members are assumed to elect a refund or a deferred benefit. It is assumed that 25% of active members who terminate with a deferred vested benefit will elect to have their contributions refunded.
- e. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt at the first age at which unreduced benefits are available, which for this plan is age 60 (65 for Tier 2).
- f. No benefit amount data is available for members entitled to deferred benefits. The benefit is estimated using the final average compensation and service provided by WRS.
- g. There will be no recoveries once disabled. We assume all disabled members are totally disabled.
- h. No surviving spouse will remarry.
- i. Administrative expenses: Assumed to be the average of the prior two years, with each year projected at 2.5% to the valuation date.
- j. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported pay represents amount paid to members during the year ended on the valuation date.
- k. Decrement timing: Decrements of all types are assumed to occur mid-year.
- l. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
- m. Decrement relativity: Decrement rates are converted to probabilities in order to account for multiple decrements.
- n. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in the report, and the actual payroll payable at the time contributions are made.
- o. Benefit Service: All members are assumed to accrue one year of service each year. Exact fractional service is used to determine the amount of benefit payable.

## APPENDIX B

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### SUMMARY OF PLAN PROVISIONS

## Summary of Plan Provisions

<b>Covered Members</b>	Any full-time or regular part-time employee of an employer as defined under W.S. 9-3-402(a)(vii)
<b>Tier</b>	Members who join the State of Wyoming Retirement System by August 31, 2012 are in Tier 1, while members who join on or after September 1, 2012 are in Tier 2.
<b>Final Average Salary</b>	For Tier 1 member: employee's average annual salary for the highest paid three continuous years of service. For Tier 2 members: employee's average annual salary for the highest paid five continuous years of service.
<b>Service Retirement</b>	
Eligibility	Tier 1 members may retire upon normal retirement on the date he/she attains age 60 with four or more years of service while Tier 2 members may retire upon normal retirement on the date he/she attains age 65 with four or more years of service. All employees may also retire upon normal retirement on the date that the sum of the member's age and service is at least 85. Tier 1 members are eligible for a reduced benefit at age 50 with four or more years of service and Tier 2 members are eligible for a reduced benefit at age 55 with four or more years of service. All members are eligible for a reduced benefit at any age with 25 or more years of service.
Benefit	For Tier 1 member: 2.125% of employee's Final Average Salary for each year of credited service for the first 15 years of service credit plus 2.25% of Final Average Salary for any years of service credit exceeding 15 years. For Tier 2 members: 2.000% of employee's Final (5-year) Average Salary for each year of credited service.  This amount is reduced by 5.0% per year that the employee is under age 60 for Tier 1 and under age 65 for Tier 2. However, members retiring with a combined age and service of at least 85 receive an unreduced benefit. Employees hired prior to July 1, 1981 may be entitled to benefits earned under a different formula.
Vesting	Any employee who has left employment with four or more years of service, and who has not withdrawn accumulated contributions, is eligible to receive the above benefit or can elect to receive a lump-sum refund of employee contributions with interest. An employee who terminates with less than four years of service is only eligible for the lump-sum benefit.
<b>Disability Benefit</b>	
Eligibility	Ten or more years of service.
Benefit	Service retirement benefit earned as of the date of disability, payable immediately.
Park Rangers	Effective March 5, 2015, for eligible peace officers as defined under W.S. 6-1-104(a)(vi)(P) whose disability is duty-related, the member shall be eligible immediately for a benefit of 62.5% of the member's final salary.

## Pre-retirement Death Benefit

Eligibility	No age or service requirements.
Benefit	A lump sum equal to two times the employee contributions with interest. If the employee is vested, the beneficiary can elect, in lieu of this lump sum, to receive a monthly annuity equal to the actuarial equivalent of the retirement benefit that would be due the employee.
Park Rangers	Effective March 5, 2015, for eligible peace officers as defined under W.S. 6-1-104(a)(vi)(P) whose death is duty-related, the member shall be eligible immediately for a benefit of 62.5% of member's final actual salary, payable to the surviving spouse plus 6% of the member's final actual salary for each unmarried child under age 18. Payment shall not exceed the member's final actual salary.

## Contributions

Employee	8.25% of salary.
Employer	8.37% plus an additional 1.0% for park rangers.
Interest	3.00% annually.

<b>Cost-of-Living Improvements</b>	W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change.
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## Optional Forms of Payment

	All options include the choice to elect a reduced benefit with a self-funded annual COLA of 1%, 2%, or 3% per year. COLAs commence on July 1 following the two-year anniversary of retirement.
Option 1	Monthly benefit for life with a lump-sum death benefit equal to the excess (if any) of the employee contributions with interest over the total benefits
Option 2	Monthly benefit for life. Upon death, 100% of the benefit continues to be paid to the beneficiary.
Option 2P	Monthly benefit for life. Upon death, 100% of the benefit continues to be paid to the beneficiary. Benefit reverts to Option 1 amount but without the cash refund feature upon beneficiary death.
Option 3	Monthly benefit for life. Upon death, 50% of the benefit continues to be paid to the beneficiary.
Option 3P	Monthly benefit for life. Upon death, 50% of the benefit continues to be paid to the beneficiary. Benefit reverts to Option 1 amount but without the cash refund feature upon beneficiary death.
Option 4a	Monthly benefit for life with a guarantee of 120 monthly payments
Option 4b	Monthly benefit for life with a guarantee of 240 monthly payments
Option 5	The largest possible monthly benefit payable for life with no lump-sum death benefit.